## Mending the Ties That Bind

## Simple Repair Method for Broken Bands on Cotton Bales

hen L. Frank Baum's
Scarecrow lost some of his
straw along the yellow
brick road, it was easy enough for
Dorothy to restuff him and continue
on to Oz. Not so with cotton bales on
their way to market.

Cotton bales weighing about 500 pounds are held together by six or eight restraining ties made of either wire or steel straps. Occasionally, one or more of the ties that encircle the cotton bale breaks. About 2 percent of the cotton bales produced in the United States experience breakage of one or more ties.

This means that each year, about 400,000 bales require repair, at a cost of \$4 to \$14 million, estimates agricultural engineer W. Stanley Anthony, who is in the ARS Cotton Ginning Research Unit at Stoneville, Mississippi.

The tie breakage can occur in the gin within seconds after baling—or days or weeks after packaging—or before or during shipping to a warehouse. Ties break or come off for a variety of reasons. The cotton can be too dry or not compressed tightly enough. Other reasons for failure include the ties' being too short, defective, or damaged in handling.

For the cotton industry, tie breakage means lost time and money. The time and place at which the break occurs determine how costly it can be for the industry. If breakage happens at the gin, the entire ginning operation may have to stop. Many gins set their defective bales aside and reband them later, a procedure that requires four people working for up to 30 minutes to completely repackage the bale.

If breakage occurs after the bale leaves the gin, damaged bales must be reshipped to either a gin or another location with a bale press available. Repair costs range from \$10 to \$35 per bale, depending on the availability

of a press. Currently, the only equipment that can be used for rebanding costs over \$300,000.

Textile mills can and do reject a significant number of bales with broken ties, according to Shay L. Simpson, manager of marketing and processing technology of the National Cotton Council of America in Memphis, Tennessee.

"If a mill rejects a bale for missing ties, shippers must handle these bales several more times to have the ties replaced and the bales returned to the mill. More handling puts stress on the bale and creates the potential for more tie breakage and bag failure that could lead to possible contamination," says Simpson.

In the spring of 1996, Anthony discussed the problem of broken ties with Mississippi gin operator LeRoy

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Deavenport. Drawing on past experience in cotton bale processing, Anthony designed a machine for rebanding broken ties. His device permits one gin operator to fix broken ties in about 10 minutes. Because of the unique design of the device, an operator can replace ties without repackaging the entire cotton bale.

Anthony has tested several models of the fix-it press, including manually operated and automatic models, to meet industry requirements. ARS and Anthony are pursuing a patent on this technology. The device may be commercially available in the fall of 1997.—By **Linda Cooke**, ARS.

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The unique design of this device developed and demonstrated by ARS agricultural engineer Stanley Anthony enables an operator to replace broken ties without repackaging an entire cotton bale.